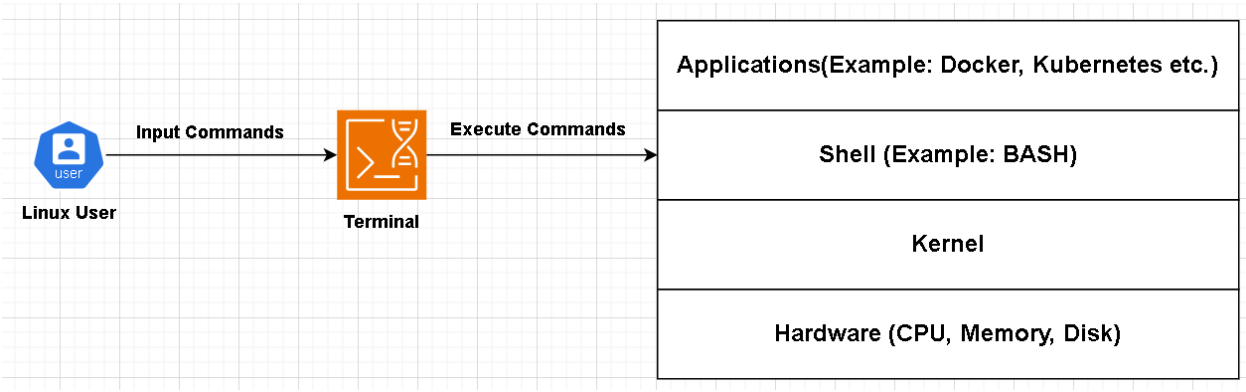
1. **Why Linux is called open source? What does it signify?**
   Open source means that the source code is public (kernel.org). This means that it can be studied, analyzed, modified, and redistributed. Examples: Arch Linux, Ubuntu, Debian, openSUSE etc. Creator of Linux and Linux kernel: Linus Torvalds

2. **What is kernel in Linux?**
   It is the main component that makes up a Linux OS. It is the interface between the hardware and software. The user-interaction happens at this level and it is the first program that loads when a machine starts.



3. **Why is Linux considered to be more secure as compared to other Operating Systems?**
   - Since it is open-source, a large number of people are able to examine it and point out vulnerabilities much earlier.
   - Its File and Directory permissions ecosystem enables for granular permissions and restrict users to particular tasks only
   - When you are creating a Linux VM, you have the option of starting with a bare minimum number of software. So, it again gives you additional insights on what piece of software are you trying to install and from where.

4. **Explain Linux Boot process:**
   A. **BIOS (Basic Input Output System)**: When you power-on the machine, the pre-installed firmware on the machine goes through POST (Power-On-Self-Test). POST means to perform Hardware checks and validate that all is okay. If yes, then BIOS loads MBR (Master Boot Record) in the hard disk.
   B. **MBR:** It is the information saved in the first sector of a hard-disk (/dev/hda or /dev/sda). It indicates where the boot loader (GRUB or GRUB2) is. This boot loader is loaded in the RAM.
   C. **GRUB2 (Grand Unified Boot Loader V2):** It loads the Linux Kernel. **/boot/grub2/grub.cfg**
   D. **Kernel (Core Of Operating System):** It loads the required drivers from **initrd.img** for all the hardware components. Then, it starts the first OS process (**systemd PID 1**). initrd is the temporary file system that is loaded into the RAM so that it can mount the real root file system.
   E. **Systemd:** It starts all the required processes. It reads **/etc/systemd/system/default.target** to bring the system to the run level. (Total of 7 levels - 0 to 6).

5. **What are run levels?**
   These are the modes in which your OS runs.

Runlevel	Legacy Runlevel Description	systemd Target	systemd Target Description
0	Halt the system (shutdown)	`poweroff.target`	Shuts down and powers off the system.
1	Single-user mode (rescue mode)	`rescue.target`	Single-user mode for maintenance and recovery.
2	Multi-user mode without networking (varies)	`multi-user.target`	Multi-user, no graphical interface; networking enabled.*
3	Multi-user mode with networking (CLI only)	`multi-user.target`	Multi-user text mode with networking.
4	Undefined/User-definable	*Custom target (if defined)*	Reserved for user-defined purposes.
5	Multi-user mode with graphical interface	`graphical.target`	Multi-user mode with GUI (X11 or Wayland).
6	Reboot the system	`reboot.target`	Reboots the system.

6. **Difference between sudo su - and sudo su.**
   sudo su - is going to make you root and change the home dir to root's home dir (/root)
   sudo su is going to make you root but will keep you in your current directory

7. **What is shell in Linux?**
   It is a command-line interface (CLI) that allows users to interact with the OS (e.g., Bash).

8. **What is a filesystem in Linux?**
   A filesystem organizes and stores files on a disk (e.g., ext3, ext4, XFS).

9. **How do you view the contents of a file page by page?**
   less <name-of-the-file> or more <name-of-the-file>

10. **How can you check the current list of local users on a system?**
    cat /etc/passwd

11. **How to check free disk space on a system?**
    df -hT

12. **What are file permissions in Linux and what is rwx?**
    File permissions control who can read, write, or execute a file. r = read, w = write, x = execute

13. **What is the umask command?**
    It sets default permissions for newly created files and directories.

14. **How to modify attributes of an existing user?**
    usermod -aG docker ubuntu

15. **How to copy a directory?**
    cp -r dir1 /home/dir2

16. **How do you check open ports?**
    netstat -tulnp or ss -tulnp

17. **Which directory stores all the log files on a system?**
    /var/log

18. **What is the difference between su and sudo?**
    su switches you to another user, while sudo executes a command as root user.

19. **How to undo a yum install on RHEL or CentOS?**

    yum history
    yum history undo <loaded-id>

20. **What are some system performance monitoring commands?**
    top or htop, vmstat, free -m, iostat (sysstat), netstat (net-tools), sar (sysstat) etc.

    sar -u 2 6; sar -r 2 5

21. How to investigate and troubleshoot an issue if the system is very slow?

simulation: dd if=/dev/zero of=/dev/null

This generally indicates that there is a process that is consuming too many resources on the system. Identify with top command, and see if you can kill it: kill PID or kill -9 PID

22. How do you schedule a script to run automatically at 11 PM everyday?

Create a cron job and configure the schedule.
crontab -e and "0 23 * * * /script/path.sh"

Field	Possible Values	Syntax	Description
Minute Within the Hour (MIN)	0 – 59	**7** * * * *	The cron job is initiated every time the system clock shows 7 in the minute's position.
Hour of the Day (HOUR)	0 – 23	**0 7** * * *	The cron job runs any time the system clock shows 7 AM (7 PM would be coded as 19).
Day of the Month (DOM)	1 – 31	**0 0 7** * *	The day of the month is 7, which means that the job runs every 7th day of the month.
Month of the Year (MON)	1 - 12 or JAN - DEC	**0 0 0 7** *	The numerical month is 7, which determines that the job runs only in July. The *Month* field value can be a number or the month abbreviation.
Day of the Week (DOW)	0 - 7 or SUN - SAT	**0 0** * * **7**	7 in the current position means that the job would only run on Sundays. The *Day of the Week* field can be a number or the day abbreviation.

23. How to check if a remote server is reachable or not?

ping server-hostname or ping server-ip

telnet server-hostname port or telnet server-ip port

24. **A user cannot access a file. How would you check and fix the permissions?**

Use ls -l to check permissions and chmod to modify them.

25. **You need to change the user and group ownership of a file to another user** and group. How would you do this?

chown user-new:group-new filename

26. **How would you troubleshoot low disk space issue on a system?**

Run df -h to find out how much space is left; then run:

du -sh * | sort -rh | head #to find out large files to delete or archive

27. **How to grant sudo access to a user?**

By adding the user to /etc/sudoers file or by adding the user to wheel group (usermod -aG wheel username)

28. **How to delete files and directories?**

rm file for files and **rm -r dir** for directories.

29. **What is chmod 755 permission.**

Owner: read/write/execute
Group: read/execute
Others: read/execute

30. **How to move or rename files?**

mv file-oldname file-newname or mv file-name /path/to/move/to

31. **What is sed command? Give an example.**

sed -i 's/old/new/g' filename

32. **Where is local user passwords stored in Linux?**

/etc/shadow

33. **How to lock and unlock a user account?**
Lock: usermod -L username and Unlock: usermod -U username

34. **What is a sticky bit in Linux?**
With this set, the users can only delete files or directories they own

PDF for Question No: 34
https://github.com/bhavukm/Linux-For-DevOps-Crash-Course/blob/master/Sticky%20Bit.pdf

35. **How to find which process is using a port?**
lsof -i :port

36. **How to mount a filesystem?**
with mount command: mount /dev/sda1 /mount

37. **How to check disk usage of a directory?**
du -sh /path/to-dir

38. **In which file do you permanently mount a disk in Linux?**
/etc/fstab

39. **How to search for error or failure logs in a log file?**
grep -i failed /var/log/messages

40. **How to secure SSH access on a Linux system?**
Enable ssh key-based authentication, disable root login and configure another port (other than 22) for SSH access

41. **How to check authentication logs?**
/var/log/secure or /var/log/auth.log

42. **How to check files opened by a process?**
lsof -p PID

43. Where can we check default DNS nameservers in Linux?

/etc/resolv.conf

44. Why do we use -r flag while deleting the user?

To ensure the user's home directory is also deleted

45. How can you monitor live system logs in Linux?

tail -f /var/log/messages

46. **A user is trying to execute a script (./script.sh) that he created and** receives the following message:

```
bash: ./script.sh: Permission denied
```

How to fix it?

chmod u+x script.sh

47. How to create a new local user group and add local users to it?

groupadd devops

usermod -aG devops engg1

grep engg1 /etc/group #to verify

48. Is Linux OS virus free?

No, there is no operating system till date that is virus free, but Linux is known to have less number of viruses.

49. How to extend the size of a FileSystem in Linux?

A. Extend the size of AWS EBS Volume in your AWS account
B. verify: lsblk
C. df -hT #identify FileSystem type, example: ext4, xfs etc
D. growpart /dev/xvda 4 #extend the partition
E. xfs_growfs -d / #extend the filesystem mount point
H. df -hT #verify the extended filesystem size

50. How to find something on a Linux machine?

find / -name filename